Space Weather Forecast

Issued on Sunday, 13 August 2023 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Peak Chance of G1/Minor Geomagnetic Storm intervals Day 2-3 (14-15 Aug). Chance of Minor Radio Blackouts/R1 throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity, as measured at GOES16 has been Low throughout the past 24 hours, with the peak flare observed a mid Common-Class flare at 12/2352UTC from the most complex region, situated on the northwest of the disc.

There are currently seven sunspot regions on the visible disc. The most complex region on the Earth-facing side of the Sun remains the aforementioned region in the northwest, however this has decayed slightly and is showing signs of simplification. A second region in the northwest has continued to show signs of development in its trailing portion. Two small regions have recently emerged on the northeast of the disc, including one quickly developing region. The other regions have remained relatively unchanged.

While there were some Coronal Mass Ejections (CMEs) visible on satellite imagery in the period, these mainly appear to be linked with the far-side western hemisphere. No Earth-directed CMEs are currently expected.

Solar Wind / Geomagnetic Activity: Solar winds have been largely at Slightly Elevated levels, initially around 420-440 km/s. Winds gradually declined through the period, fluctuating between Slightly Elevated and Slow-Ambient levels.

The associated magnetic field has remained weak and steady. The important north-south component has weakly fluctuated and since 13/0450 UTC has largely remained oriented northward, weakly aligned with Earth's magnetic field.

The net result of the above solar wind measures was for Quiet (Kp 0-2) geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed with high-energy proton flux at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a daily chance of isolated Moderate-class flares, most likely from the most complex regions in the northwest. Activity is expected to remain Low, with a Chance of increasing to Active, most probably on Days 2-3 (14-15 Aug), before the regions in the northwest rotate across the western limb.

Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs. The next fast wind enhancement is expected either late Day 2 (14 Aug) or early Day 3 (15 Aug), with speeds potentially reaching 500km/s. Mainly Quiet (Kp 0-2) geomagnetic activity initially, becoming Unsettled to Active (Kp 3-4) from Day 2, with an increasing Chance of G1/Minor Geomagnetic storm (Kp 5) intervals in association with coronal hole influences Days 2-3. A transition to a second (probably less potent) fast wind is then a possibility late on Day 4 (16 Aug), resulting in a very Slight Chance of a G1/Minor Geomagnetic storm interval.

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Energetic Particles / Solar Radiation: No solar radiation storms are expected, with the high-energy proton flux expected to remain at Background levels, with only a very slight chance of rising in response to any flares from the most complex regions.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	40	40	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	40	40	30
Very Active	R3 to R5 X	No	5	5	5	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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